ORDER NO. MTNC010306C1
B5

Service Manual

Color Television

Main Manual
(NA7D)

CT-27G6E/DE/UE

SP-2724E/UE

Panasonic

Models	Chassis
CT-25G6E	**AP361**
CT-25G6CE	**AP361**
CT-25G6UE	**AP361**
CT-27G6E	**AP362**
CT-27G6DE	**AP362**
CT-27G6UE	**AP362**

Quasar

Models	Chassis
SP-2724E	**EC363**
SP-2724UE	**EC363**

This Service manual is issued as a service guide for the models of the **NA7D** family listed above. Included are schematics, alignment procedures, disassembly procedures, and a parts list.

"**WARNING!** This Service Manual is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. **Products powered by electricity should be serviced or repaired only by experienced professional technicians.** Any attempt to service or repair the product or products dealt with in this Service Manual by anyone else could result in serious injury or death."

The service technician is required to read and follow the "**Safety Precautions**" and "**Important Safety Notice**" in this Manual.

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Panasonic®

Quasar®

Service Mode (Electronic Controls)

This Receiver has electronic technology using the I²C Bus Concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using "On Screen Display Menu". (The **Service Adjustment Mode**.)

Note: *It is suggested that the technician reads all the way through and understand the following procedure for Entering/Exiting the **Service Adjustment Mode**; then proceed with the instructions working with the Receiver. When becoming familiar with the procedure, the Flow Chart for Service Mode may be used as a quick guide.*

Quick Entry to Service Mode:

At times when minor adjustments need to be done to the electronic controls, the method of Entering the service Mode without removal of the cabinet back is as follows using the Remote Control:

1. Adjust VOLUME to minimum (0).
2. Set CC Mode (Close Caption) OFF.
3. Select SET-UP icon and select CABLE mode.
4. Select TIMER icon and set SLEEP time for 30, 60 or 90 Min.
5. Press ACTION button twice to exit menus.
6. Tune to the Channel 124.
7. Press the VOL ◀ button (decrease) **on Receiver**. Red "CHK" appears in the left upper corner.

To toggle between Aging and Service modes:

While the "CHK" is displayed on the left top corner of the CRT, pressing the Action and the Volume Up buttons on the Receiver simultaneously will toggle between the modes. Red "CHK" for Service and yellow "CHK" for Aging.

Note: *Three additional indicators appear on screen. One is the five digit usage in hours and the other two are four digits for V-Chip Main and Child ratings. Indicators are hexadecimal numbers.*

8. **Press** the **Power** Button on the **Remote Control** to select one of seven Service Adjustment Modes.
   1. **B**= Service VCJ SUB-DATA adjustments.
   2. **C**= Service VCJ CUT-OFF adjustments.
   3. **M**= Service MTS adjustments.
   4. **P**= Service VCJ adjustments.
   5. **S**= Service OPTIONS (PICTURE) adjustments.
   6. **X** = Service AFC adjustments.
   7. "**CHK**" = Normal operation of CHANNEL ▲▼ and VOLUME ◀ ▶.

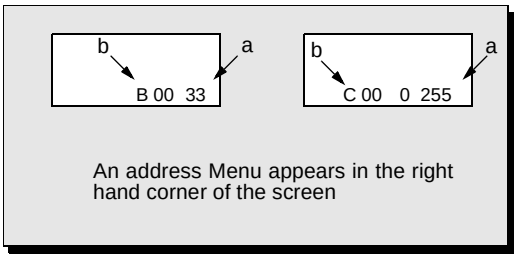


Figure 14. **Service Mode Menu Adjustments.**

Note: *Only the applicable settings for the Receiver serviced will be available (See a in Fig. 14).*

Exiting the Service Mode:

Press the **Action** and the **Power** buttons on the **Receiver** simultaneously for at least 2 seconds.

THE RECEIVER EXITS SERVICE MODE

The Receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound. Any programmed channels, channels caption data and some others user defined settings will be erased.

IMPORTANT
Always Exit the Service Mode Following Adjustments.

Instructional Flow Chart for Service Mode

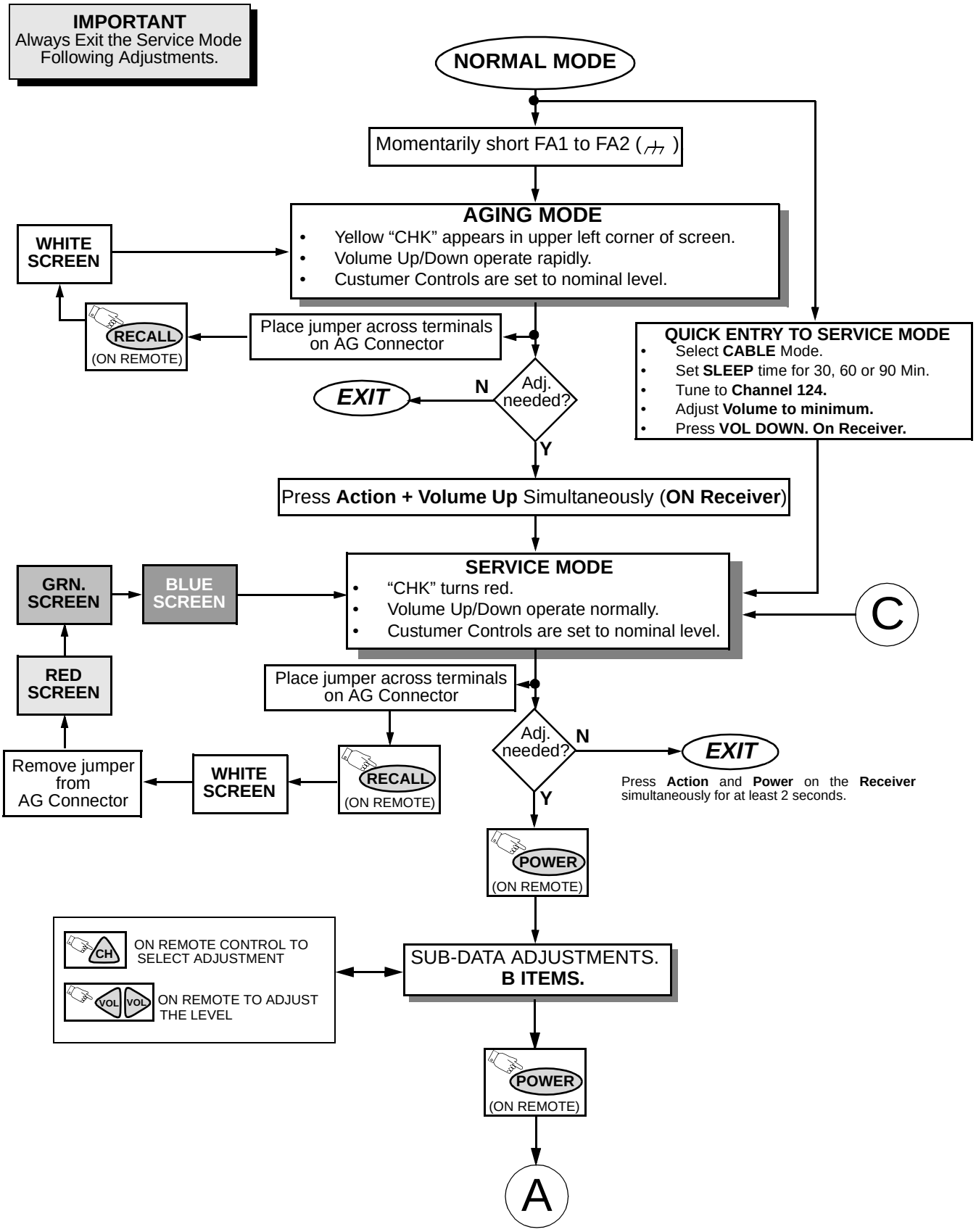
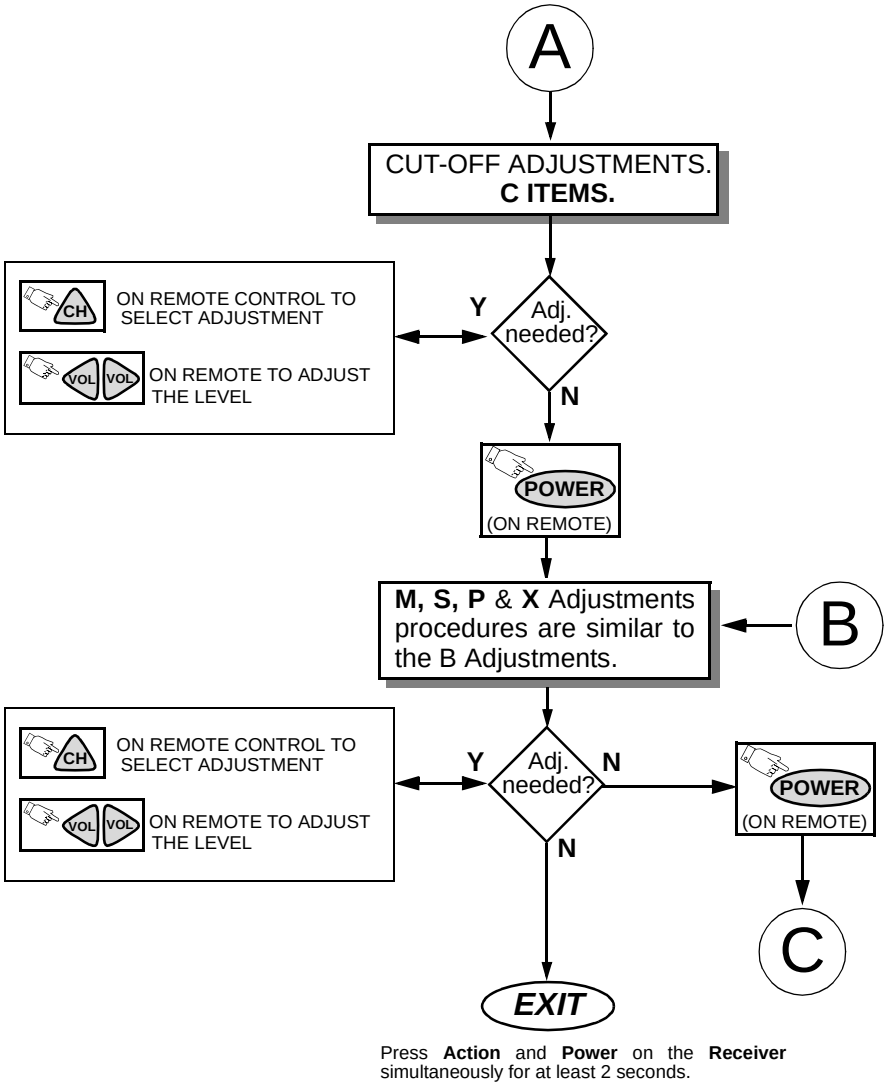


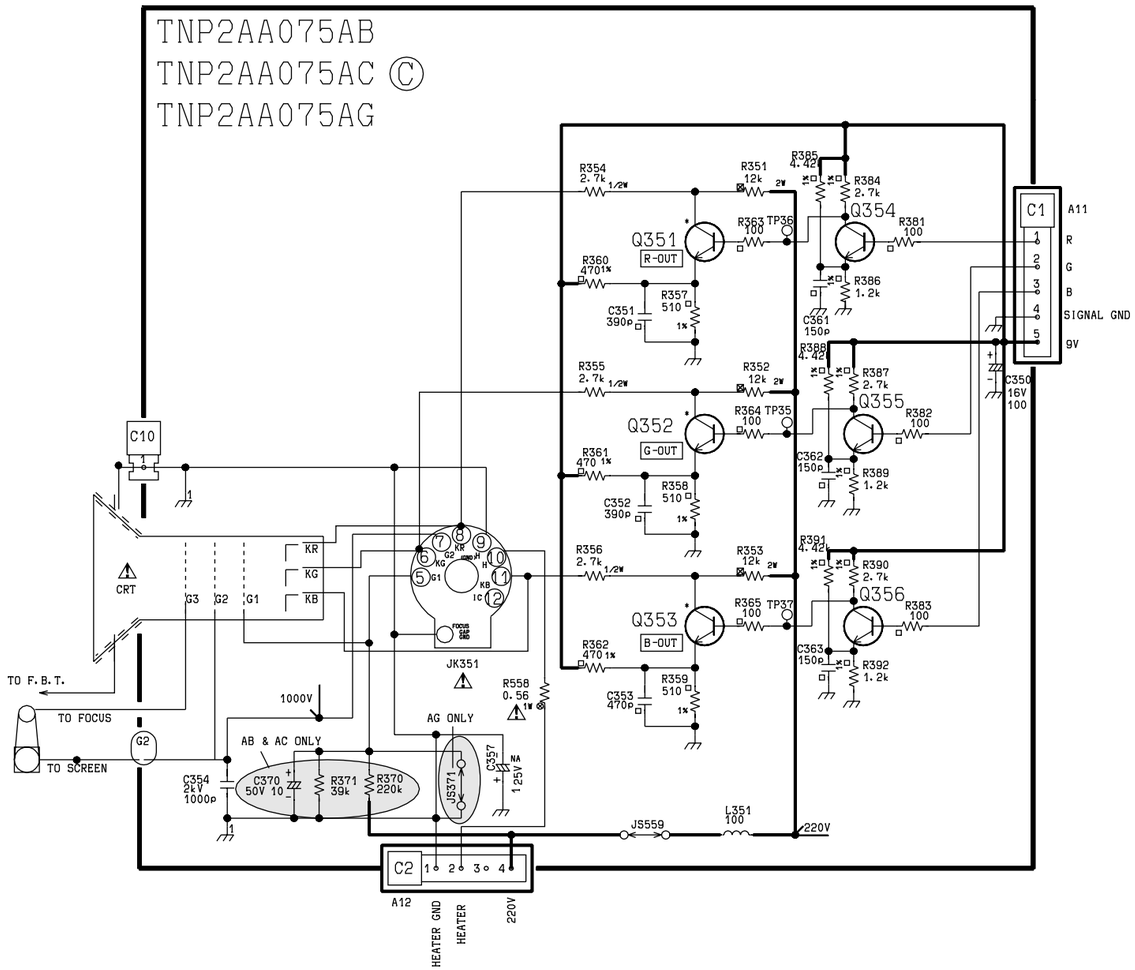
Figure 16. **Flow Chart for Service Mode.**



Note: *Only applicable settings for the Receiver serviced will be available.*

IMPORTANT
Always Exit the Service Mode Following Adjustments.

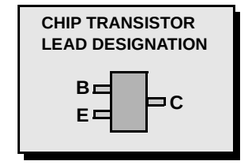
Figure 17. Flow Chart for Service Mode (Cont.)



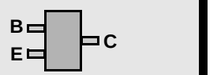
Notes:

- Check Parts List for most recent component values and part numbers.
- Obtain voltages with a digital multimeter.
- The board layouts were modified to enhance and display traces otherwise hidden by a mask.

CHIP TRANSISTOR LEAD DESIGNATION



IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*



	Q351	Q352	Q353
B	7.47	7.40	7.40
C	96.00	98.20	98.90
E	7.00	6.90	6.90

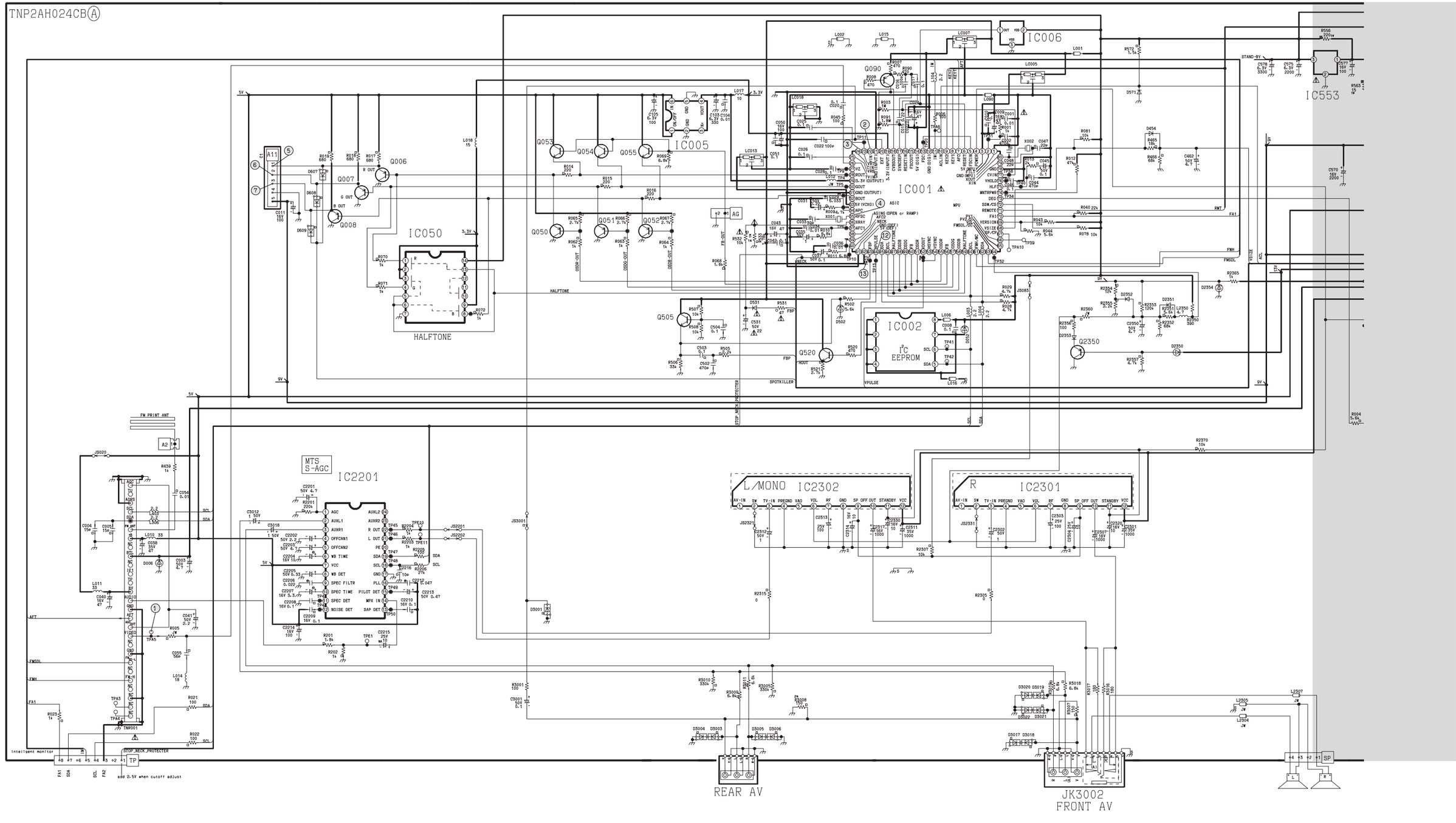
	Q354	Q355	Q356
B	2.90	2.90	2.90
C	7.50	7.40	7.40
E	2.40	2.40	2.40

Notas:

- Verifique los números de parte de los componentes y sus valores en la lista de partes.
- La medición de los voltajes se hizo con un Voltímetro Digital.

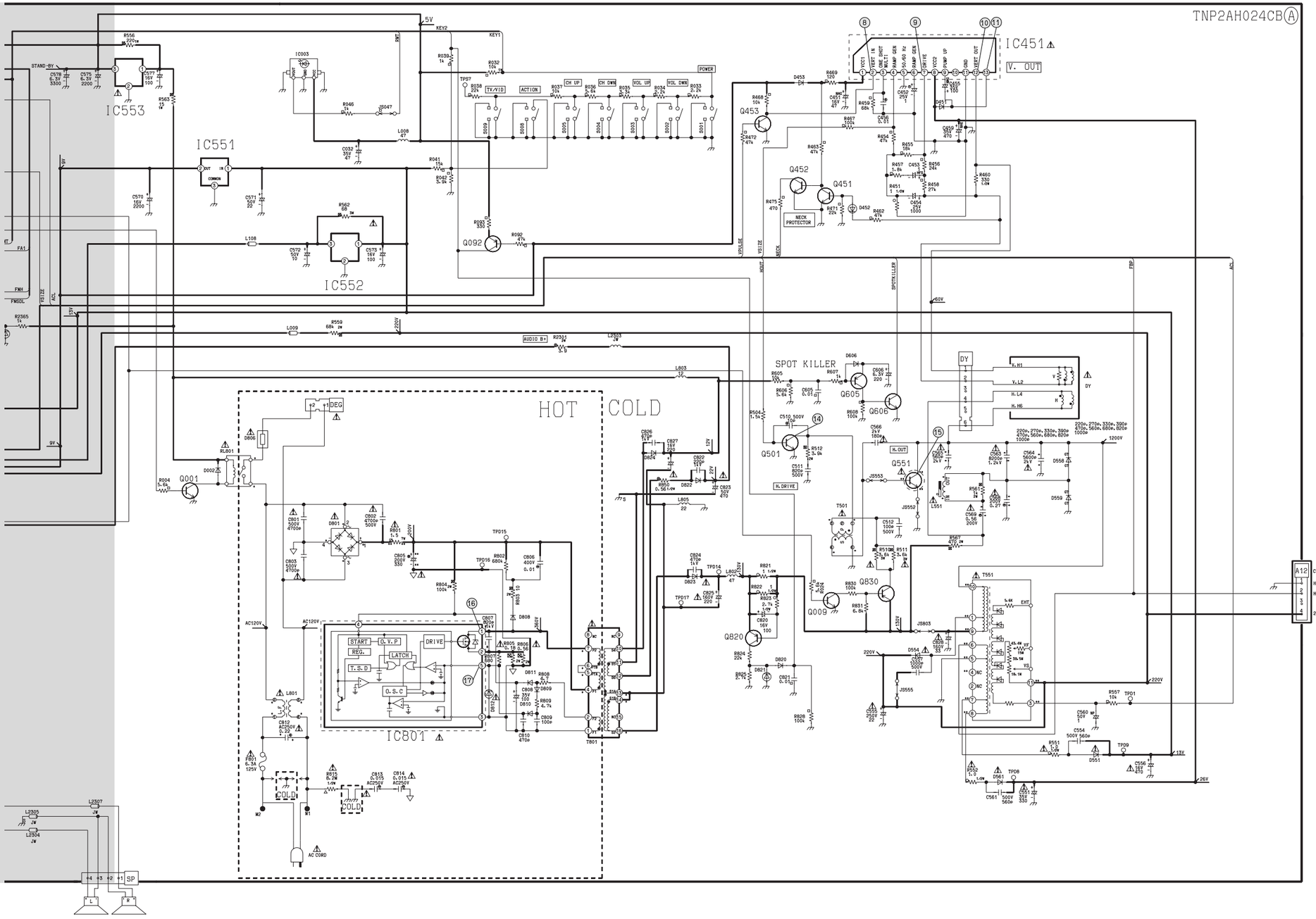
A-BOARD -- TARJETA A
CT-25G6E/CE/UE

A-BOARD SCHEMATIC LEFT PORTION -- DIAGRAMA ELÉCTRICO TARJETA A SECCIÓN IZQUIERDA



A-BOARD SCHEMATIC RIGHT PORTION -- DIAGRAMA ELÉCTRICO TARJETA A SECCIÓN DERECHA

A-BOARD -- TARJETA A
CT-25G6E/CE/UE



CHIP TRANSISTOR LEAD DESIGNATION

B
E
C

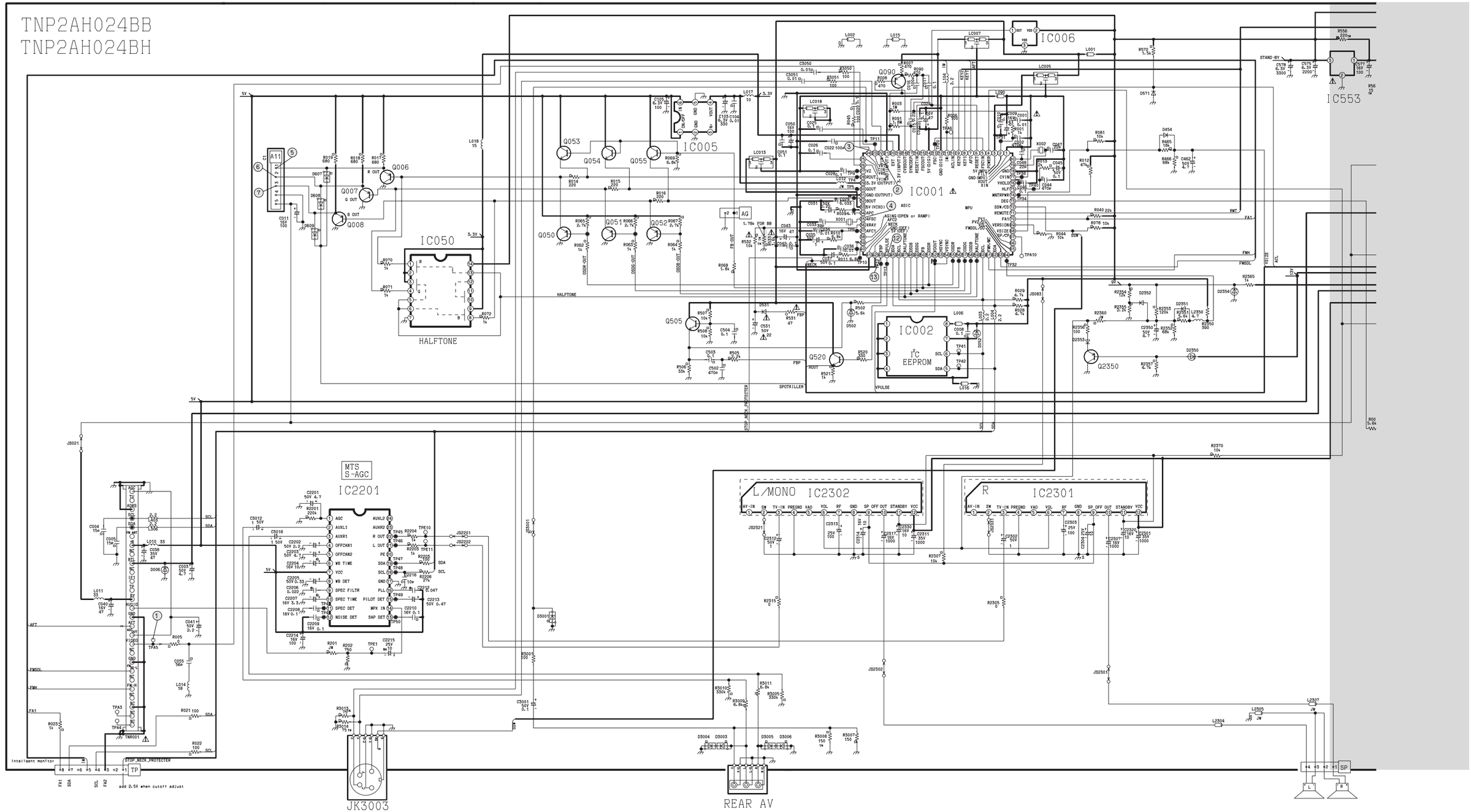
IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*

B
E
C

A-BOARD - TARJETA A
CT-27G6E/CE/UE & SP2724E/UE

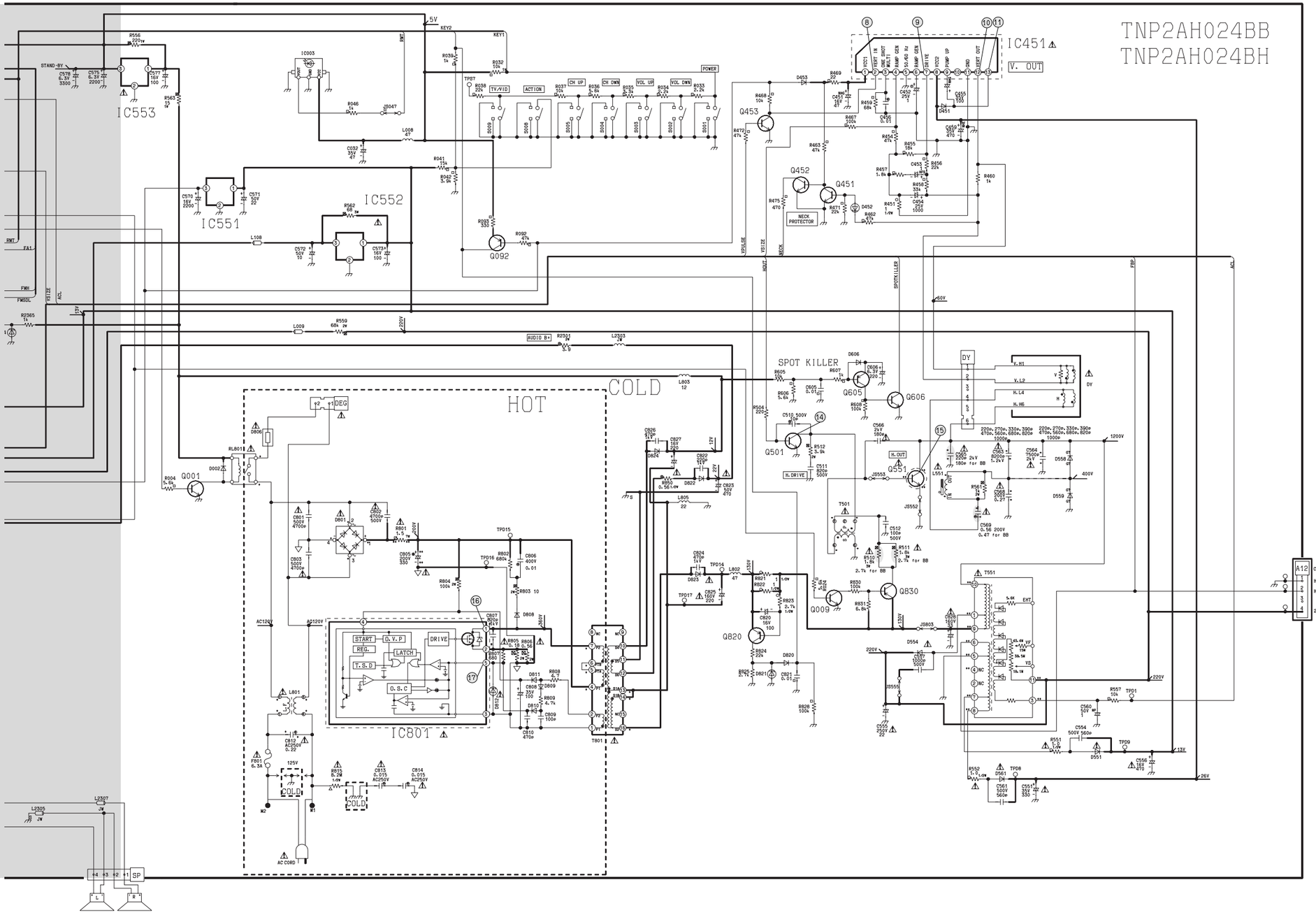
A-BOARD SCHEMATIC LEFT PORTION -- DIAGRAMA ELÉCTRICO TARJETA A SECCIÓN IZQUIERDA

TNP2AH024BB
TNP2AH024BH



A-BOARD SCHEMATIC RIGHT PORTION -- DIAGRAMA ELÉCTRICO TARJETA A SECCIÓN DERECHA

A-BOARD -- TARJETA A
CT-27G6E/CE/UE & SP2724E/UE



CHIP TRANSISTOR LEAD DESIGNATION

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*

A-BOARD -- TARJETA A
ALL MODELS -- TODOS LOS MODELOS

A-BOARD VOLTAGES -- VOLTAJES TARJETA A

IC001

1	GND	41	GND
2	1.39	42	4.97
3	4.98	43	2.32
4	4.91	44	1.76
5	2.47	45	4.46
6	4.95	46	4.20
7	2.43	47	0.00
8	4.99	48	4.96
9	2.36	49	4.96
10	2.90	50	0.00
11	4.95	51	4.97
12	GND	52	0.17
13	2.47	53	n.c
14	4.97	54	0.17
15	n.c	55	4.97
16	4.98	56	0.00
17	2.93	57	4.97
18	1.35	58	4.97
19	3.21	59	0.00
20	0.52	60	4.16
21	GND	61	0.00
22	0.62	62	4.45
23	1.69	63	0.00
24	1.09	64	0.39
25	0.45	65	0.00
26	0.95	66	0.00
27	2.06	67	0.00
28	2.59	68	1.94
29	3.26	69	4.98
30	2.69	70	4.98
31	GND	71	4.97
32	2.67	72	4.98
33	4.98	73	0.00
34	2.85	74	4.96
35	2.68	75	1.95
36	2.37	76	0.18
37	2.41	77	2.16
38	n.c	78	0.00
39	2.71	79	2.28
40	2.49	80	2.40

IC002

1	GND
2	GND
3	GND
4	GND
5	4.40
6	4.15
7	GND
8	4.99

IC003

1	4.97
2	GND
3	4.98

IC005

1	5.01
2	GND
3	n.c
4	3.26
5	GND
6	5.01

IC006

1	5.00
2	4.98
3	GND

IC050

1	2.59
2	3.20
3	3.21
4	2.69
5	0.00
6	0.00
7	GND
8	2.67
9	3.21
10	n.c
11	n.c
12	n.c
13	0.00
14	4.99

IC451

1	8.18
2	8.66
3	4.10
4	4.15
5	GND
6	3.92
7	3.99
8	24.32
9	1.79
10	n.c
11	GND
12	14.01
13	24.67

IC551

1	12.00
2	GND
3	8.95

IC552

1	12.01
2	GND
3	5.01

IC553

1	8.96
2	GND
3	8.91

IC801

1	193.00
2	0.00
3	GND
4	32.80
5	2.81

IC2201

1	1.16
2	2.17
3	2.16
4	2.23
5	2.17
6	0.43
7	4.91
8	2.42
9	2.47
10	0.51
11	2.26
12	0.00
13	3.34
14	2.16
15	3.29
16	3.45
17	GND
18	4.97
19	0.20
20	n.c
21	2.24
22	2.20
23	2.17
24	2.17

IC2301

1	14.00
2	n.c
3	13.70
4	GND
5	9.90
6	2.71
7	16.81
8	GND
9	4.98
10	8.80
11	3.41
12	18.81

IC2302

1	13.58
2	n.c
3	13.62
4	GND
5	9.88
6	2.69
7	16.65
8	GND
9	4.97
10	8.80
11	3.55
12	18.73

	Q001	Q006	Q007	Q008	Q009	Q050	Q051	Q052
B	0.00	2.59	2.68	2.65	0.59	4.98	4.97	4.98
C	11.00	GND	GND	GND	0.00	GND	GND	GND
E	GND	3.24	3.33	3.31	GND	2.59	2.69	2.67

	Q053	Q054	Q055	Q090	Q092	Q451	Q452	Q453
B	0.00	0.00	0.00	1.31	8.92	0.60	0.00	0.00
C	5.00	5.01	5.01	0.00	2.37	0.00	2.49	8.66
E	2.59	2.68	2.65	2.04	4.99	GND	GND	GND

	Q501	Q505	Q520	Q551	Q605	Q606	Q820	Q830
B	0.36	2.46	1.76	0.00	4.05	0.00	130.30	129.80
C	85.20	4.98	4.98	-25.30	0.00	3.68	0.00	127.80
E	GND	2.32	1.60	GND	4.01	GND	130.70	130.40

SERVICE MODE (ELECTRONIC CONTROL)
SERVICE ADJUSTMENT VALUES

Model _____ Ser #_____ Date_____

Note: Record the original settings PRIOR to modifying the registers.

Mode	Service Adjustment	Adjustment Range	Def. Val.	Original Value	New Value
Sub Adjustments					
B0	SUB-COLOR	0 ~ 127	33		
B1	SUB-TINT	0 ~ 127	36		
B2	SUB-BRIGHTNESS	0 ~ 255	127		
B3	SUB-CONTRAST	0 ~ 127	20		
B4	R OFFSET	N/A	0	FACTORY PRESET	
B5	YNR	N/A	0	FACTORY PRESET	
B6	YNR LIM	N/A	0	FACTORY PRESET	
Cut-Off Adjustments					
C0	CUT-OFF R	0 ~ 255 0 ~ 255	0 255		
C1	CUT-OFF G	0 ~ 255 0 ~ 255	0 255		
C2	CUT-OFF B	0 ~ 255 0 ~ 255	0 255		
C3	R DRIVE	0 ~ 127	80		
C4	G DRIVE	0 ~ 127	80		
C5	B DRIVE	0 ~ 127	80		
C6	V SIZE	0 ~ 255	127		
C7	NOT USED	--	--	NOT USED	
C8	NOT USED	--	--	NOT USED	
C9	HORIZONTAL CENTER	0 ~ 31	16		
CA	ACL	0 ~ 1	1		
CB	HHS	0 ~ 7	0		
CC	OSD SHIFT	N/A	88	FACTORY PRESET	
CD	ACL-REF	N/A	74	FACTORY PRESET	
CE	ACL-REF	N/A	64	FACTORY PRESET	
CF	ACL-REF	N/A	48	FACTORY PRESET	
C10	ACL-REF	N/A	40	FACTORY PRESET	
C11	ACL-REF	N/A	31	FACTORY PRESET	
C12	ACL-REF	N/A	20	FACTORY PRESET	
C13	ACL-COEFF	N/A	124	FACTORY PRESET	

Mode	Service Adjustment	Adjustment Range	Def. Val.	Original Value	New Value
Cut-Off Adjustments, Cont.					
C14	ACL-COEFF	N/A	117	FACTORY PRESET	
C15	ACL-COEFF	N/A	94	FACTORY PRESET	
C16	ACL-COEFF	N/A	80	FACTORY PRESET	
C17	ACL-WAIT	N/A	2	FACTORY PRESET	
C18	ACL-THRESHOLD	N/A	9	FACTORY PRESET	
C19	MACROVISION	N/A	3	FACTORY PRESET	
C1A	OSD SELECT	N/A	1	FACTORY PRESET	
C1B	KILLER ON	N/A	6	FACTORY PRESET	
C1C	KILLER OFF	N/A	20	FACTORY PRESET	
C1D	KILLER TIME	N/A	3	FACTORY PRESET	
C1E	ACC THRESHOLD	N/A	17	FACTORY PRESET	
C1F	ACC OFF	N/A	7	FACTORY PRESET	
C20	MUTE TIME	N/A	11	FACTORY PRESET	
MTS Adjustments					
M0	INPUT LEVEL	0 ~ 63	33		
M1	HIGH-LEVEL SEPARATION	0 ~ 63	25		
M2	LOW-LEVEL SEPARATION	0 ~ 15	6		
M3	AGC ADJ	N/A	0	FACTORY PRESET	
Options Adjustments					
S0	SHARPNESS PW	N/A	3	FACTORY PRESET	
S1	SHARPNESS OW	N/A	3	FACTORY PRESET	
S2	HALFTONE	N/A	0	FACTORY PRESET	
S3	TVC DELAY	N/A	0	FACTORY PRESET	
S4	TVY DELAY	N/A	0	FACTORY PRESET	
S5	GAMMA	N/A	13	FACTORY PRESET	
S6	VIDEO Y DELAY	N/A	0	FACTORY PRESET	
S7	VIDEO C DELAY	N/A	0	FACTORY PRESET	
S8	COMB BPF	N/A	0	FACTORY PRESET	
S9	COMB 2D	N/A	1	FACTORY PRESET	
SA	COLOR KILLER LEVEL	N/A	0	FACTORY PRESET	

SERVICE MODE, CONT. (ELECTRONIC CONTROL)
SERVICE ADJUSTMENT VALUES

Model _____ Ser #_____ Date_____

Note: Record the original settings PRIOR to modifying the registers.

Mode	Service Adjustment	Adjustment Range	Def. Val.	Original Value	New Value
Options Adjustments (Cont.)					
SB	KILLER THRESHOLD	N/A	0	FACTORY PRESET	
SC	ACC SW	N/A	0	FACTORY PRESET	
SD	ACC AMP OFF1	N/A	100	FACTORY PRESET	
SE	ACC AMP OFF2	N/A	0	FACTORY PRESET	
SF	ACC AMP ON	N/A	20	FACTORY PRESET	
S10	ACC AMP CTL	N/A	3	FACTORY PRESET	
S11	BGP POSITION	N/A	21	FACTORY PRESET	
S12	OSD R	N/A	30	FACTORY PRESET	
S13	OSD G	N/A	30	FACTORY PRESET	
S14	OSD B	N/A	30	FACTORY PRESET	
S15	NOISE KILLER TIME	N/A	5	FACTORY PRESET	
S16	NOISE KILLER (ACC)	N/A	50	FACTORY PRESET	
S17	HV TIMING	N/A	2	FACTORY PRESET	
VCJ Adjustments (Black Expansion)					
P0	FORCE BS	N/A	1	FACTORY PRESET	
P1	DET ON/OFF	N/A	1	FACTORY PRESET	
P2	ROM SEL	N/A	3	FACTORY PRESET	
P3	ROM CURVE	N/A	2	FACTORY PRESET	
P4	BS ON/OFF	N/A	1	FACTORY PRESET	
P5	BS TIME CONSTNAT	N/A	5	FACTORY PRESET	
P6	THRESHOLD V	N/A	4	FACTORY PRESET	
P7	THRESHOLD F1	N/A	129	FACTORY PRESET	
P8	THRESHOLD F1	N/A	1	FACTORY PRESET	
P9	THRESHOLD OFF1 (EFFECT OFF)	N/A	35	FACTORY PRESET	
PA	THRESHOLD F2	N/A	99	FACTORY PRESET	
PB	THRESHOLD F2	N/A	1	FACTORY PRESET	
PC	THRESHOLD OFF2 (EFFECT OFF)	N/A	30	FACTORY PRESET	

Mode	Service Adjustment	Adjustment Range	Def. Val.	Original Value	New Value
VCJ Adjustments, Cont. (Black Expansion)					
PD	THRESHOLD F3	N/A	80	FACTORY PRESET	
PE	THRESHOLD F3	N/A	1	FACTORY PRESET	
PF	THRESHOLD OFF3 (EFFECT OFF)	N/A	21	FACTORY PRESET	
P10	THRESHOLD ON1	N/A	37	FACTORY PRESET	
P11	THRESHOLD ON2	N/A	33	FACTORY PRESET	
P12	THRESHOLD ON3	N/A	25	FACTORY PRESET	
P13	CURVE1	N/A	3	FACTORY PRESET	
P14	CURVE2	N/A	3	FACTORY PRESET	
P15	CURVE3	N/A	3	FACTORY PRESET	
P16	RATIO1	N/A	0	FACTORY PRESET	
P17	RATIO2	N/A	2	FACTORY PRESET	
P18	RATIO3	N/A	3	FACTORY PRESET	
Other Adjustments (With FM)					
X0	AFCT	0 ~ 127	83		
X1	AFCB	0 ~ 127	44		
X2	AFCC	0 ~ 127	64		
X3	CLOCK	0 ~ 255	128		
Other Adjustments (Without FM)					
X0	AFCT	0 ~ 127	60		
X1	AFCB	0 ~ 127	29		
X2	AFCC	0 ~ 127	42		
X3	CLOCK	0 ~ 255	128		

Note: *Some adjustments modes may not be available on all models, depending on applicability.*

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